

**We claim:**

1. Apparatus for controlling the guiding and alignment of circuit board assemblies with sockets of a backplane, said apparatus comprising;  
a vertically oriented backplane having a plurality of sockets;  
5 a vertical guide plate positioned perpendicular to said backplane;  
a plurality of horizontal guide slots in said guide plate;  
a front guide post and a rear guide post affixed to a vertical side wall of a circuit board assembly;

10 an open front portion of each said guide slot adapted to slidably receive said

guide posts;

said guide posts and said guide slots cooperate to align and guide said circuit board assembly towards one of said sockets when said guide posts are moved from a front end portion of said guide slot towards said backplane;

15 a rear portion of said circuit board assembly adapted to engage one of said

sockets;

a void that disengages said rear guide post from said guide slot when said circuit board assembly is moved towards said backplane to a position in which said rear portion of said circuit board assembly is proximate side walls of said one socket; and

20 contacts on said rear portion of said circuit board assembly adapted to

electrically mate with contacts on said one socket when said circuit board assembly is moved further towards said backplane so that said rear portion of said circuit board assembly fully engages said one socket.

25 2. The apparatus of claim 1 wherein said side walls of said one socket and side walls of said rear portion of said circuit board assembly contain protrusions and slots that are effective subsequent to said disengagement to align and control said engagement of said rear portion of said circuit board assembly into said one socket.

30 3. The apparatus of claim 1 in which said apparatus that disengages comprises a void positioned in said guide plate and integral with an open rear end portion of said guide slot;

35 said void receives said rear guide post when said rear portion of said circuit board assembly is moved to a position in which the rear portion of said circuit board assembly is proximate said one socket;

said void is of a size sufficient to enable said rear guide post to move vertically and horizontally by an amount that facilitates said engagement of said rear portion of said circuit board assembly with said one socket..

5 4. The apparatus of claims 1 wherein said circuit board assembly is supported by the said guide posts when said guide posts engage said guide slot.

5. The apparatus of claim 1 wherein said front end portion of said guide slot has an upwardly flared upper edge and a downwardly flared lower edge to define a 10 vertical spacing greater than the vertical spacing defined by the remainder of said guide slot.

6. The apparatus of claim 1 wherein said sockets are arranged in a horizontal row and vertical column format on said backplane.

15 7. The apparatus of claim 6 wherein a plurality of guide plates are positioned between adjacent columns of said sockets;  
each guide slot can receive guide posts of a different circuit board assembly.

20 8. The apparatus of claim 1 wherein said rear portion of said circuit board assembly is a plug;  
said contacts on said plug define pins and contacts on said one socket define mating voids for electrically engaging said pins of said plug.

25 9. The apparatus of claim 1 wherein said rear portion of said circuit board assembly is a plug;  
said contacts on said one socket define pins and contacts on said plug define mating voids for electrically engaging said pins of said one socket.

30 10. The apparatus of claim 1 further including:  
a second circuit board assembly;  
a first pair of guide posts positioned on the upper front and upper rear portion of a side wall of said second circuit board assembly;

a second pair of guide posts positioned on a lower front and lower rear portion of said side wall of said second circuit board assembly; and

5 said first and second pair of guide posts are adapted to engage first and second guide slots of a guide plate to control the alignment of a rear portion of said second circuit board assembly with a socket of said backplane.

11. Apparatus for controlling the guiding and alignment of circuit board assemblies with sockets of a backplane, said apparatus comprising;

a vertically oriented backplane having a plurality of sockets;

10 a vertical guide plate positioned perpendicular to said backplane;

a plurality of horizontal guide slots in said guide plate;

a front guide post and a rear guide post affixed to a vertical side wall of a circuit board assembly;

15 an open front portion of each said guide slot adapted to slidably receive said

guide posts;

said guide posts and said guide slots cooperate to align and guide said circuit board assembly towards one of said sockets when said guide posts are moved from a front end portion of said guide slot towards said backplane;

20 a plug on a rear portion of said circuit board assembly adapted to engage one of said sockets;

a void that disengages said rear guide post from said guide slot when said circuit board assembly is moved towards said backplane to a position in which said plug is proximate side walls of said one socket; and

25 contacts on said plug adapted to electrically mate with contacts on said one socket when said circuit board assembly is moved further towards said backplane so that said plug fully engages said one socket;

30 said side walls of said one socket and side walls of said plug contain protrusions and slots that are effective subsequent to said disengagement to align and control the engagement of said plug into said one socket.

12. The apparatus of claim 11 wherein said sockets are arranged in a horizontal row and vertical column format on said backplane; said apparatus further comprising:

a second circuit board assembly;

a first pair of guide posts positioned on the upper front and upper rear portion of a side wall of said second circuit board assembly;

a second pair of guide posts positioned on a lower front and lower rear portion of said side wall of said second circuit board assembly;

5 said first and second pair of guide posts are adapted to engage first and second guide slots of a guide plate to control the alignment of said plug on the rear portion of said second circuit board assembly with a socket of said backplane.

13. 10 A method for controlling the guiding and alignment of circuit board assemblies with sockets of a vertically oriented backplane;

a vertically oriented guide plate perpendicular to said backplane and having a plurality of horizontal guide slots;

said method comprising the steps of:

15 inserting a rear guide post affixed to a side wall of said circuit board assembly into a front opening of a guide slot;

moving said rear guide post of said circuit board assembly towards said backplane to a position in which a front guide post on said side wall of said circuit board assembly engages said front opening of said guide slot;

20 moving said circuit board assembly towards said backplane to a position in which a back surface of a plug on the rear portion of said circuit board assembly is proximate a socket adapted to engagingly receive said plug;

moving said circuit board assembly further towards said backplane to a position in which protrusions or slots on the side walls of said plug enter slots or protrusion on the side walls of said sockets; and

25 moving said circuit board assembly further towards said backplane to a position in which contacts on the rear portion of said plug and contacts on said socket are electrically engaged.

14. 30 A method of claim 13 comprising the further step of disengaging said rear guide post from said guide slot when the rear portion of said circuit board assembly is proximate said socket.

15. The method of claim 14 herein said step of disengaging defines a step of; moving said circuit board assembly towards said backplane to a position in which

said rear guide post disengages from a rear portion of said guide slot and enters a void integral with the rear terminus of said guide slot; and

aligning said plug and said one socket under control of protrusion and slots on said side walls of said one socket and said plug that are effective subsequent to said 5 disengagement to engage said plug with said one socket.

16. The method of claim 13 wherein said contacts on said plug and socket define pins on said plug and mating voids in said socket.

10 17. The method of claim 13 wherein said contacts on said plug and socket define voids on said plug and mating pins on said socket.

18. The method of claim 13 wherein sockets are arranged in a row and column format on said backplane; said method comprising the further steps of:

15 positioning a plurality of vertically oriented guide plates proximate said backplane with each guide plate being positioned between a different pair of columns of said sockets;

affixing guide posts to side walls of a plurality of said circuit board assemblies;

20 inserting said guide posts into a plurality of horizontal guide slots in said plurality of guide plates; and

electrically connecting contacts on said plugs with contacts on the sockets into which said plugs are inserted by an alignment controlled by said guide posts on said circuit board assemblies and said guide slots in said guide plates.